DTC P0115/22 WATER TEMP. CIRCUIT MALFUNCTION

CIRCUIT DESCRIPTION

A thermistor built into the water temperature sensor changes the resistance value according to the water temperature.

The structure of the sensor and connection to the ECM is the same as the ones of the air temperature sensor.

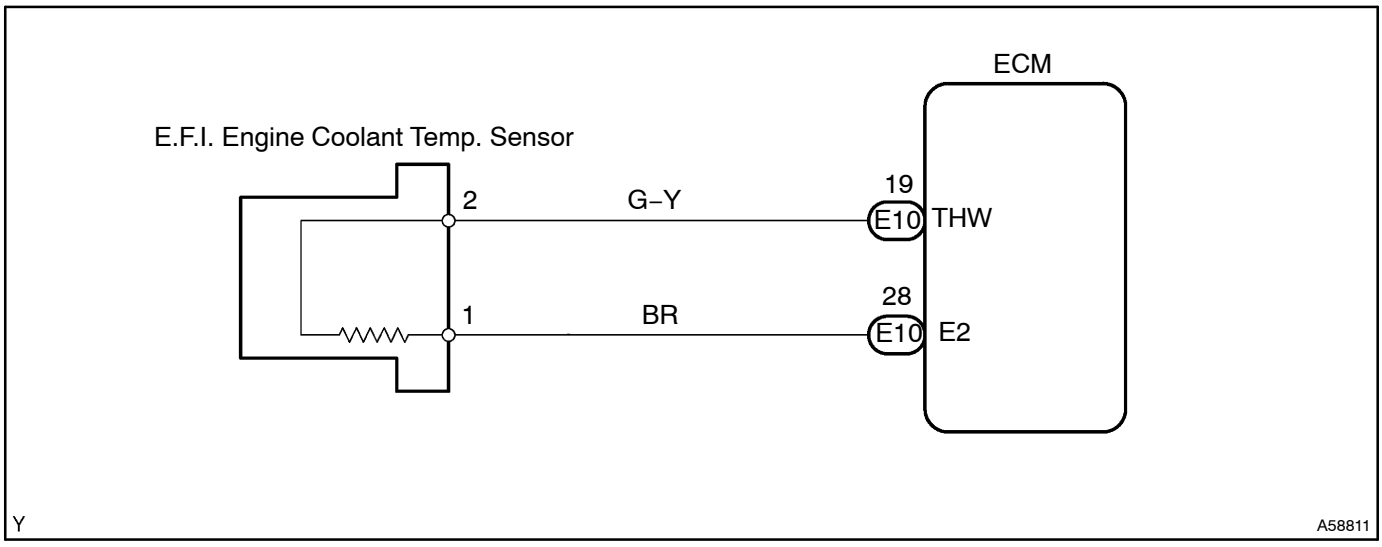
DTC No.	DTC Detecting Condition	Trouble Area
P0115/22	Open or short in water temp. sensor circuit	• Open or short in water temp. sensor circuit • E.F.I. engine coolant temp. sensor • ECM

HINT:

After confirming DTC P0115/22, use the hand–held tester to confirm the engine coolant temperature from the CURRENT DATA.

Temp. Displayed	Malfunction
–40˚C (–40˚F)	Open circuit
140˚C (284˚F) or more	Short circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTCs P0100/31, P0110/24, P0115/22 and P0120/41 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using the hand–held testerl, as freeze frame data records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

When using Hand–held Tester:

1	READ VALUE OF HAND–HELD TESTER(WATER TEMPERATURE)

(a) Read temperature value on the hand–held tester.
Temperature: Same as actual water temperature
Result:

A	B	C
OK	–40°C (–40°F)	140°C (284°F)

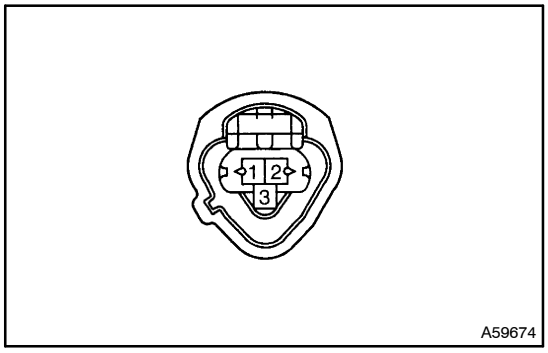
B → **Go to step 2**

C → **Go to step 4**

A

CHECK FOR INTERMITTENT PROBLEMS

2	READ VALUE OF HAND–HELD TESTER(CHECK FOR OPEN IN HARNESS)

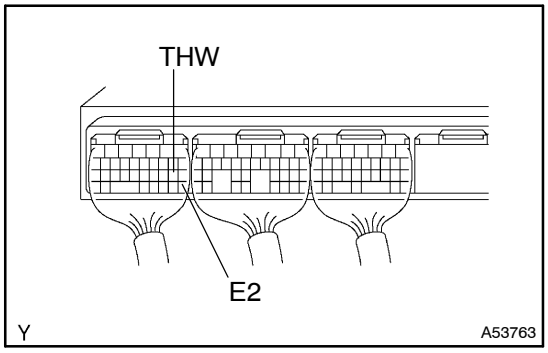


(a) Disconnect the E.F.I. engine coolant temperature sensor connector.
(b) Connect the terminals 1 and 2 of the water temperature sensor connector.
(c) Turn the ignition switch ON.
(d) Read temperature value on the hand–held tester.
Temperature: 140°C (284°F) or more

OK → **REPLACE E.F.I. ENGINE COOLANT TEMPERATURE SENSOR**

NG

3	READ VALUE OF HAND–HELD TESTER(CHECK FOR OPEN IN ECM)



(a) Connect the terminals THW of the ECM connector and E2 of the ECM connector.
(b) Turn the ignition switch ON.
(c) Read temperature value on the hand–held tester.
Temperature: 140°C (284°F) or more

OK → **REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR**

NG

CHECK AND REPLACE ECM

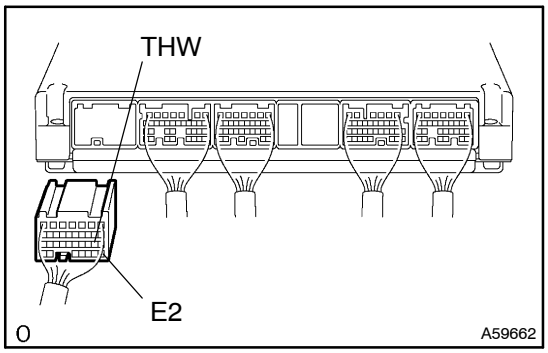
4	READ VALUE OF HAND–HELD TESTER(CHECK FOR SHORT IN HARNESS)

(a) Disconnect the E.F.I. engine coolant temp. sensor connector.
(b) Turn the ignition switch ON.
(c) Read temperature value on the hand–held tester.
Temperature: –40°C (–40°F)

OK → **REPLACE E.F.I. ENGINE COOLANT TEMPERATURE SENSOR**

NG

5	READ VALUE OF HAND–HELD TESTER(CHECK FOR SHORT IN ECM)



(a) Disconnect the ECM E10 connector.
(b) Turn the ignition switch ON.
(c) Read temperature value on the hand–held tester.
Temperature: –40°C (–40°F)

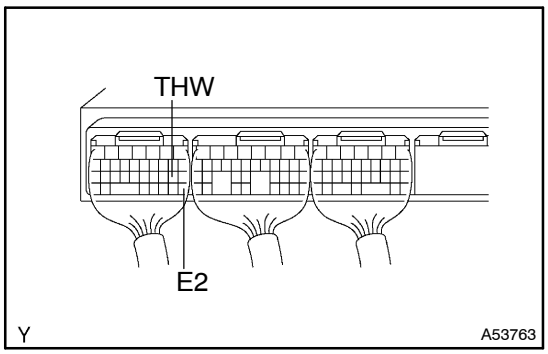
OK → **REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR**

NG

CHECK AND REPLACE ECM

When not using Hand–held Tester:

1	INSPECT ECM(CHECK VOLTAGE)



(a) Turn the ignition switch ON.
(b) Measure voltage between the terminals THA and E2 of the ECM connector.

VOLTAGE:

Intake air temp. °C (°F)	Voltage
20 (68)	0.5 – 3.4 V
60 (140)	0.2 – 1.0 V

OK → **CHECK CHECK FOR INTERMITTENT PROBLEMS**

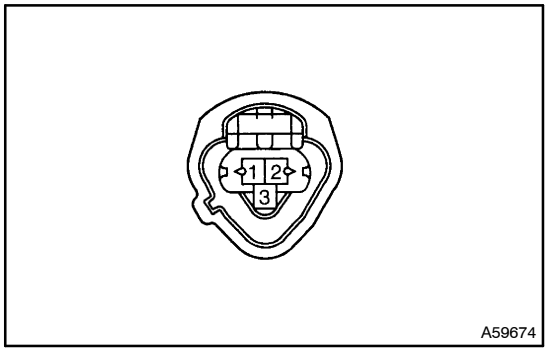
NG

2	CHECK E.F.I. ENGINE COOLANT TEMPERATURE SENSOR (See page 10–2)

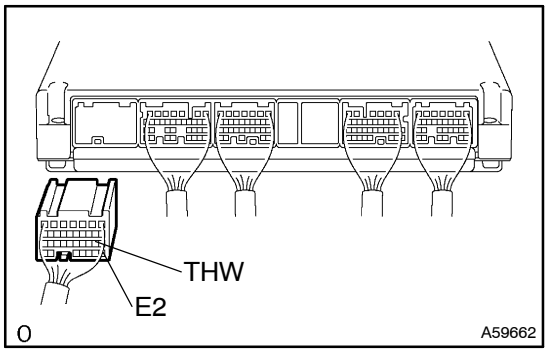
NG → **REPLACE E.F.I. ENGINE COOLANT TEMPERATURE SENSOR**

OK

3	CHECK WIRE HARNESS OR CONNECTOR(ECM–E.F.I. ENGINE COOLANT TEMP. SENSOR)



(a) Disconnect the E.F.I. engine coolant temperature sensor connector.
(b) Disconnect the ECM E10 connector.
(c) Check for open between the terminals 2 of the water temperature sensor connector and THW of the ECM connector.
Resistance: 1 Ω or less
(d) Check for short between the terminals THW and E2 of the ECM connector.
Resistance: 1 MΩ or more



NG → **REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR**

OK

CHECK AND REPLACE ECM